

TWO NEW SPECIES AND ONE NEW RECORD SPECIES OF THE GENUS *BACTROCERA* FROM YUNNAN, CHINA (DIPTERA, TEPHRITIDAE)

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Abstract We studied the specimens of the genus *Bactrocera* collected from Yunnan and recognized 2 new record subgenera, *Javadacus* Hardy and *Papuodacus* Drew, 1 new record species, *Bactrocera* (*Javadacus*) *trilineata* (Hardy), and 2 new species, *Bactrocera* (*Javadacus*) *apiciflava* Yu, He et Chen, sp. nov. and *Bactrocera* (*Papuodacus*) *sinensis* Yu, Bai et Chen, sp. nov. The type specimens are deposited in the Chinese Academy of Inspection and Quarantine (CAIQ), Beijing.

Key words Diptera, Tephritidae, *Bactrocera*, new species, China.

Both *Javadacus* and *Papuodacus* are small subgenera in the genus *Bactrocera*. Only nine known species (Bezzi, 1916; Perkins, 1938; Hardy, 1951, 1955, 1983; Drew, 1989) belong to the subgenus *Javadacus* and two known species (Drew, 1971, 1989; White, 1999) belong to the subgenus *Papuodacus* in the world. *Javadacus* is similar to *Papuodacus* in the following characters: chaetotaxy of head and thorax reduced, lacking ocellar, postocellar, humeral, anterior supraalar, dorsocentral, katepisternal and postpronotal setae; prescutellar acrostichal setae present; abdominal tergites not fused; pecten of cilia present on tergite 3 of male; sternite 5 of male slightly concave on posterior margin; posterior lobe of surstylus long. *Javadacus* has one pair of scutellar setae, while *Papuodacus* has two pairs of scutellar setae.

Seven subgenera of the genus *Bactrocera* were known from China (Wang, 1996). Here the subgenera *Javadacus* and *Papuodacus* are newly recorded from China and only known from Yunnan at present. A key to the world species of the two subgenera is provided.

The general terminology follows White *et al.* (1999). Genitalic preparations were made by macerating the apical portion of the abdomen in cold saturated NaOH for 12 – 14 h. After maceration, genitalia were examined in fresh glycerine and stored in a pinned below the specimen. The following abbreviations are used: a spal s-anterior supraalar seta, fr s-frontal seta, gn s-genal seta, ial s-intra alar seta, i vt s-inner vertical seta, npl s-notopleural seta, orb s-orbital seta, o vt s-outer vertical seta, pprn s-postpronotal seta, psctl acr s-prescutellar acrostichal

seta, pal s-posterior supraalar seta, scap-scapula setae, sctl s-scutellar seta.

Key to world species of subgenus *Javadacus*.

1. Scutum with three yellow vittae 2
Scutum with two yellow vittae 7
2. Wing with transverse mark over dm-cu crossvein
..... *B. (J.) javanensis* (Perkins)
Wing without transverse mark over dm-cu crossvein 3
3. Face with one black spot on each side; anepisternal stripe medium-sized, reaching anterior notopleural seta 4
Face with medial longitudinal black band or entirely yellow; anepisternal stripe broad, reaching postpronotal lobe 5
4. Scutellum with a large black spot at apex; notopleuron entirely black
..... *B. (J.) scutellaria* (Bezzi)
Scutellum without black spot at apex; notopleuron entirely yellow
..... *B. (J.) apiciflava* sp. nov.
5. Face entirely yellow 6
Face shining black through middle from bases of antennae to oral margin *B. (J.) montana* (Hardy)
6. Front with 2 pairs of frontal setae; scutellum without black spot at apex; femurs yellow or pale without dark spots
..... *B. (J.) trilineata* (Hardy)
Front with 3 pairs of frontal setae; scutellum with a large black spot at apex; femurs pale with dark spots
..... *B. (J.) maculifemur* (Hering)
7. Scutum black in ground color 8
Scutum red-brown in ground color 9
8. Wing with costal band overlapping R_{2+3}
..... *B. (J.) melanothoracica* Drew
Wing with costal band confluent with R_{2+3}
..... *B. (J.) nigrita* (Hardy)
9. Scutum red-brown without dark marks
..... *B. (J.) pallescentis* (Hardy)
Scutum red-brown in ground color with dark marks 10
10. Wing with costal band overlapping R_{2+3} ; abdomen brownish without marks *B. (J.) univiridis* Drew
Wing with costal band confluent with R_{2+3} ; abdomen brownish with T-shaped mark on tergites 3 – 5 *B. (J.) aberrans* (Hardy)

Key to world species of subgenus *Papuodacus*.

1. Thorax red brown without dark markings; wing with costal band not

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- widened at apex *B. (P.) neopallescens* Drew
 Thorax red brown with large dark markings; wing with costal band widened at apex 2
2. Scutellum yellow, with a narrow black band at base; costal band of wing wide, confluent with R_{4+5} , transverse mark over crossveins r-m and dm-cu present; all femora yellow; tergites 3 – 5 without mid-longitudinal black stripe *B. (P.) complicata* White
 Scutellum mostly yellow, with a narrow black band at base and a medium-sized black spot at apex; costal band of wing narrow, confluent with R_{2+3} , transverse mark over crossveins r-m and dm-cu absent; all femora predominantly yellow with distinct dark spots at apex; tergites 3 – 5 with a narrow to moderately wide mid-longitudinal black stripe *B. (P.) sinensis* sp. nov.

***Bacterodacus (Javadacus) apiciflava* Yu, He et Chen, sp. nov.** (Figs 1 – 6)

Description. Male. Body length 6.3 – 6.7 mm, wing length 5.3 – 5.7 mm.

Head fulvous. Frons fulvous, parallel-sided, anteromedially with fuscous hump and a few short setulae on hump; ocellar triangle black; a dark brown to black mark extending across vertex and connecting with ocellar triangle; lunule brown; face fulvous with one pair of largely black facial spots; gena fulvous; one brown spot below each eye; occiput brown, but yellow along eye margins. Occipital row with some black setae. Antenna yellow except segment 3 fulvous on apex and outer surface; segment 1 with a few brown to black setulae dorsally, segment 2 with some yellow setulae and 1 dark brown seta, segment 3 3 – 4 times longer than wide; arista bare, black but yellow basally; length of segments: 0.11 mm, 0.28 mm, 0.69 mm. Setae on head black; 2 fr s, 1 orb s, with spots at base of fr s and orb s; 1 i vt s, 1 o vt s and 1 gn s. Proboscis and palpus fulvous.

Thorax (Fig. 2). Scutum shining black in ground color, postpronotal lobes entirely yellow. Pleuron predominantly red-brown to black with following yellow markings: notopleuron, medium anepisternal stripe, slightly wider than notopleuron dorsally, not reaching postpronotal lobes, small spot on katapisternum, anatergite, anterior 4/5 of katatergite. Two yellow mid lateral vittae parallel, ending slightly beyond base of ial s and connecting with yellow mark on each side before suture; median vitta yellow narrower than lateral vittae. Postnotum shining black. Scutellum yellow with a narrow black band at base. A spal s and pprn s absent; 1 pal s, 1 ial s, 1 psctl acr s and 2 sctl s; 2 npl s and 4 scap s. Legs mainly yellow; coxae and trochanters dark brown to black; outer surface of fore femur shining black, inner surface yellow; mid femur fulvous except apical 1/2 black; hind femur fulvous except apical 2/5 black; basal portions of fore and mid tibiae fuscous; hind tibiae dark brown; tarsi fulvous. Mid tibia with an apical black spur. Wing (Fig. 3) largely hyaline; costal band dark brown, confluent with R_{2+3} and

expanded into a large spot at apex; anal streak medium and extending to posterior margin; cells bc and c colourless; microtrichiae located only at outer corner of cell c, dense setulae covering $A_1 + CuA_2$; a fulvous spot at apical CuA_1 . Supernumerary lobe weak. Halter yellowish.

Abdomen (Fig. 4) oval, tergites free. Tergite 1 and sternites 1 – 2 wider than long. Ground color black. Apex of tergites 1 – 2 with broad fulvous band; tergites 3 – 5 black; tergites 3 – 5 with a narrow to moderately wide mid-longitudinal black stripe; pecten of cilia present on posterior margin of tergite 3; submedian yellow spots on tergites 3 – 4; apex of tergite 5 fulvous. A pair of oval fulvous shining spots on tergite 5. Sternites 1, 3, 4 – 5 dark brown to black; sternite 2 yellowish. Sternite 5 (Fig. 6) slightly concave on posterior margin. Posterior surstylus lobe (Fig. 5) long.

Female. Unknown.

Etymology. The specific name refers to the yellow apical portion of the scutellum.

Holotype ♂, Yunnan, Hekou (22.4° N, 103.9° E), Sep. 2008, HE Wan-Zhong. Paratypes 3 ♂♂, same date as holotype.

Distribution. China (Yunnan).

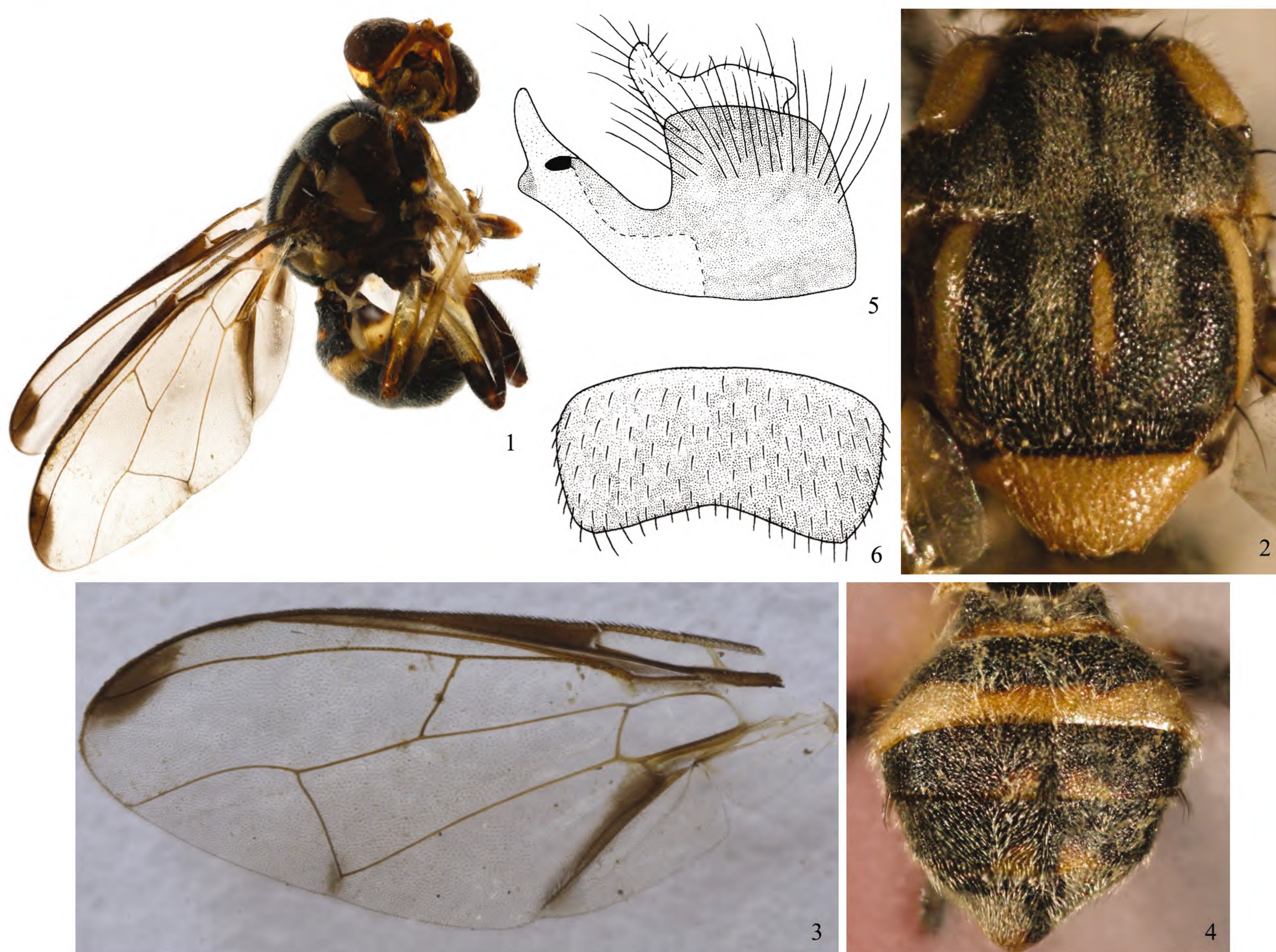
Remarks. The new species is somewhat similar to *B. (J.) scutellaria* (Bezzi) from India in the following characters: face pale yellow with black spots; scutum shining black in ground color; scutum with three postsutural yellow vittae; abdomen largely black. It can be separated from the latter by the following characters: frons with 2 fr s and 1 orb s; notopleuron entirely yellow; scutellum without black spot at apex; outer surface of fore femur shining black, inner surface yellow; basal portions of fore and mid tibiae fuscous, hind tibia dark brown; wing expanded into a large spot at apex. In *B. (J.) scutellaria*, the frons has 3 fr s and 1 orb s; the notopleuron is entirely black; the scutellum has a large black spot at apex, reaching the middle of the scutellum; the fore femur is almost entirely black, yellow at the extreme base and apex; the fore and hind tibiae are black, and the mid tibia is black but pale at middle (Bezzi, 1916; Drew and Raghu, 2002).

***Bactrocera (Javadacus) trilineata* (Hardy) New record to China** (Figs 7 – 11)

Dacus (Afrodacus) trilineatus Hardy, 1955: 12. Type locality: Sarakki Village, Bangalore, India.

Description. Male. Body length 5.6 mm, wing length 4.8 mm.

Head fulvous. Frons fulvous, parallel-sided, anteromedially with brown hump and a few short setulae on hump; ocellar triangle black; vertex fuscous; lunule fulvous; face entirely yellow without



Figs 1 – 6. *Bactrocera (Javadacus) apiciflava* Yu, He *et* Chen, sp. nov., ♂. 1. Adult of male in lateral view. 2. Scutum. 3. Wing. 4. Adult of male abdomen in dorsal view. 5. Epandrium, cercus and surstylus in profile. 6. Sternite 5.

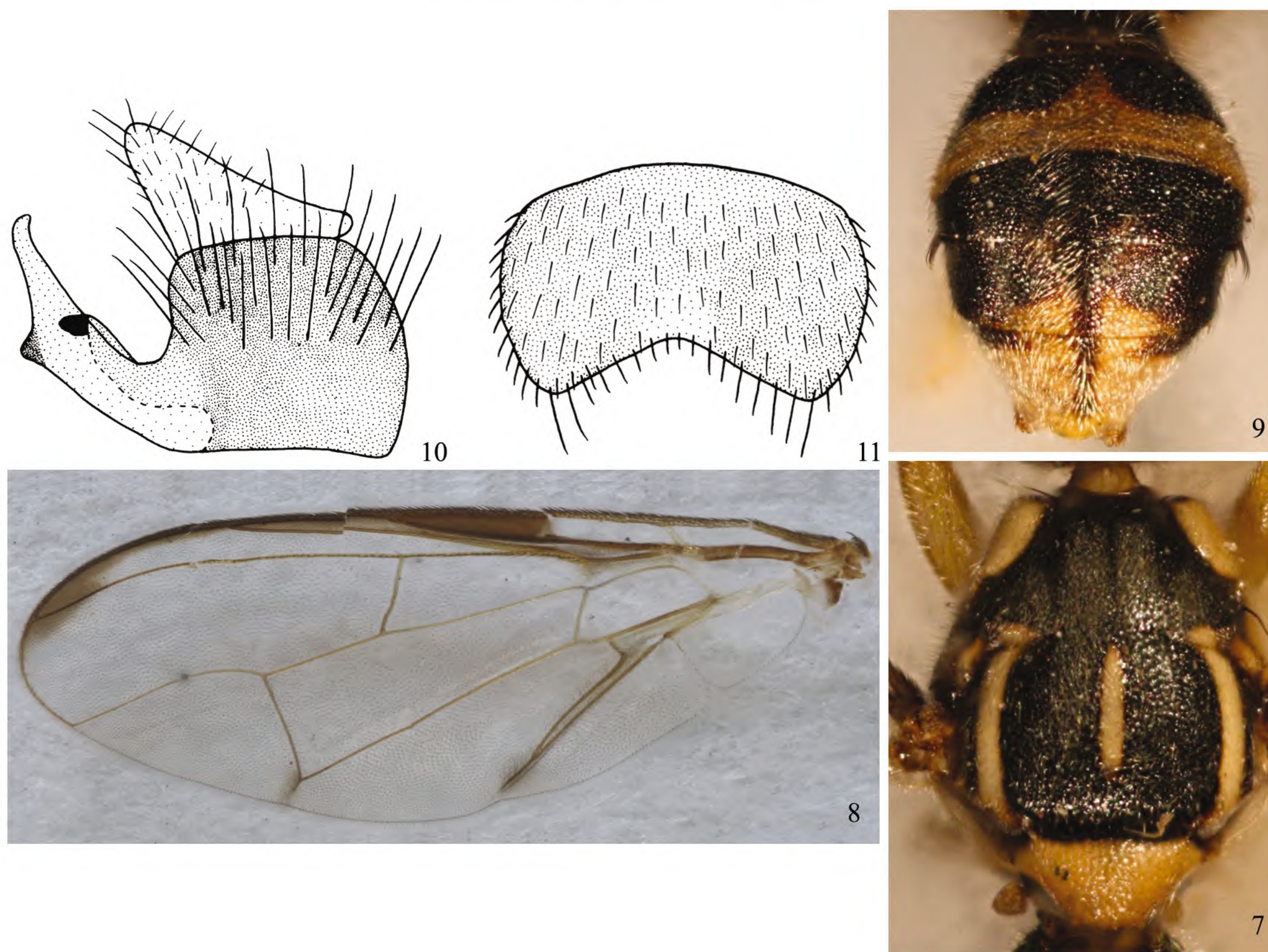
dark facial spots; genae yellow; one small fulvous spot below each eye; occiput largely brown to black, but broad yellow along eye margins. Antenna yellow to rufous except segment 3 fulvous on apex; segment 1 with a few brown to black setulae dorsally, segment 2 with some yellow setulae, segment 3 3 – 4 times longer than wide; arista bare, black but yellow basally; length of segments: 0.11 mm, 0.25 mm, 0.53 mm. Setae on head black; 2 fr s, 1 orb s, with spots at base of fr s and orb s; 1 i vt s, 1 o vt s and 1 gn s. Proboscis and palpus fulvous.

Thorax (Fig. 7). Scutum shining black in ground color, postpronotal lobes entirely yellow. Pleuron predominantly red-brown to black with following yellow markings: middle of notopleuron, broad anepisternal stripe reaching postpronotal lobe, small spot on katepisternum, anterior 3/4 of anatergite, anterior 2/3 of katatergite. Two yellow mid to broad lateral vittae parallel, ending slightly beyond base of ial s and connecting with yellow mark on each side before suture; median vitta yellow slightly narrower than lateral vittae, ending before base of psctl acr s. Postnotum black. Scutellum yellow with a narrow black band at base. a spal s and pprn s absent;

1 p spal s, 1 ial s, 1 psctl acr s and 2 sctl s; 2 npl s and 4 scap. Legs yellow but little brown on outer apical portion of hind femur and fulvous on apical portion of hind tibia. Wing (Fig. 8) largely hyaline; costal band confluent with R_{2+3} , interrupted at apex of R_{2+3} and expanded into a small spot on apex of R_{4+5} ; anal streak narrow and not extending to posterior margin, cells bc and c colourless; microtrichiae located only at outer corner of cell c, dense setulae covering $A_1 + CuA_2$. Supernumerary lobe weak. Halter yellowish.

Abdomen (Fig. 9) oval, tergites free. Tergite 1 and sternites 1 – 2 wider than long. Ground color black. Apex of tergites 1 – 2 fulvous; submedian yellow spots on tergites 3 – 4; pecten of cilia present on posterior margin of tergite 3; tergites 3 – 5 with a narrow to moderately wide mid-longitudinal black stripe; tergite 5 fulvous with black mark anterolaterally. One pair of oval fulvous shining spots on tergite 5. Sternites 1, 3, 4 – 5 dark brown; sternite 2 yellowish. Sternites 5 (Fig. 11) slightly concave on posterior margin. Posterior surstylus lobe (Fig. 10) long.

Female. Unknown.



Figs 7 – 11. *Bactrocera* (*Javadacus*) *trilineata* Hardy. 7. Scutum. 8. Wing. 9. Adult of male abdomen in dorsal view. 10. Epandrium, cercus and surstylus in profile. 11. Sternite 5.

Material examined. 1 ♂, Yunnan, Xishuangbanna, Aug. 2009, DENG Yu-Liang.

Distribution. China (Yunnan); India, Sri Lanka.

Remarks. The species is somewhat similar to *B.* (*J.*) *montana* Hardy from Indonesia in the following characters: frons with two pairs of frs and one pair of orb s; scutum shining black in ground color; scutum with three postsutural yellow vittae; broad anepisternal stripe reaching postpronotal lobe. It can be separated from the latter by the following characters: face entirely yellow without facial spots; legs almost entirely yellow; abdomen black in ground color. But in *B.* (*J.*) *montana*, the face is shining black through the middle from the bases of antennae to the oral margin; the apical portions of all femora are shining black; the abdomen is fulvous in ground color (Hardy, 1983).

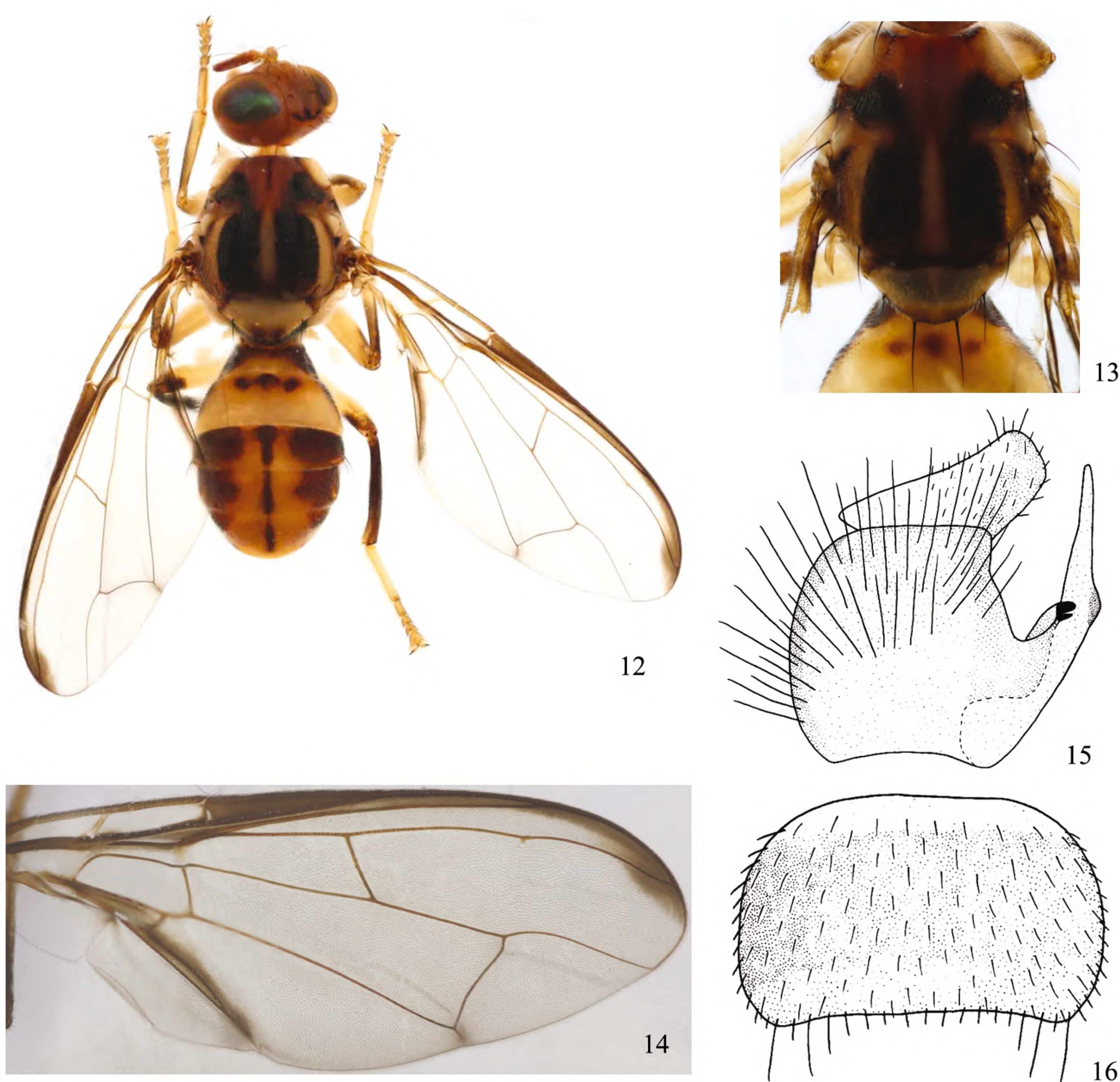
***Bacterodacus* (*Paouodacus*) *sinensis* Yu, Bai et Chen, sp. nov.** (Figs 12 – 16)

Description. Male. Body length 6.5 – 7.6 mm, wing length 6.2 – 6.8 mm.

Headfulvous. Frons fulvous, parallel-sided, frons antero-medially with brown hump and a few short setulae on hump; ocellar triangle black; a fuscous mark extending across vertex and connecting with ocellar triangle; lunule yellow; face fulvous with one pair of medium-sized oval black facial spot (length

0.25 mm); genae fulvous; one small fuscous spot below each eye; occiput fulvous, but yellow along eye margins, occipital row with some black setae. Antenna yellow with segment 3 dark brown to black at apex and outer surface; segment 1 with a few brown to black setulae dorsally; segment 2 with some yellow setulae and 1 dark brown seta; segment 3 3 – 4 times longer than wide; arista bare, black but yellow basally; length of segments: 0.13 mm, 0.25 mm, 0.63 mm. Head setae black with 3 fr s, 1 orb s, 1 i vt s, 1 o vt s, 1 gn s. Proboscis and palpus fulvous.

Thorax (Fig. 13). Scutum yellow to red brown in ground color, with black markings from postpronotal lobe to transverse suture and between lateral postsutural vitta and medial vitta; a narrow medial longitudinal black stripe, almost connecting medial vitta, on presutural area. Postpronotal lobes entirely yellow. Pleuron predominantly red brown to black with following yellow markings: notopleuron, narrow anepisternal stripe, as wide as notopleuron dorsally, posterior 1/2 of katepisternite, anatergite, katatergite. Two yellow mid lateral vittae parallel, ending slightly beyond base of ial s and connecting with yellow mark on each side before suture; median vitta yellow equal to or slightly narrower than lateral vittae and blunt posteriorly, extending slightly beyond suture and almost reaching pscl acr s. Postnotum mostly black, red brown centrally. Scutellum yellow



Figs 12 – 16. *Bactrocera (Papuodacus) sinensis* Yu, Bai et Chen, sp. nov., ♂. 12. Adult of male in dorsal view. 13. Scutum. 14. Wing. 15. Sternite 5. 16. Epandrium, cercus and surstylus in profile.

with a narrow black band at base and a medium-sized black spot at apex. a spal s and pprn s absent, 1 p spal s, 1 ial s, and 1 psctl acr s, 2 npl s, 4 scap and 4 scl s. Legs yellow except middle and hind coxae and trochanters fuscous; femora fulvous with distinct dark spots on apical outer surfaces of all femora; outside of fore tibia, basal 1/2 of mid tibia and hind tibia dark brown; tarsi fulvous; mid tibia with an apical black spur. Wing (Fig. 14) largely hyaline; costal band dark brown, confluent with R_{2+3} and slightly expanded at apex, anal streak narrow and not extending to posterior margin, cells bc and c colourless; microtrichia located only at outer corner of cell c, dense setulae covering $A_1 + CuA_2$; a fulvous spot at apex of CuA_1 . Supernumerary lobe of medium development. Halter yellowish.

Abdomen oval, tergites free. Tergite 1 and sternites 1 and 2 wider than long. Ground color yellow. Base and lateral margin of tergite 1 black; three black anterior spots on tergite 2 forming a dark transverse band, which does not reach lateral margins, black stripe at lateral margin of tergite 2 not reaching posterior margin; a complete black anterior band

present on tergite 3, sometimes this black band is interrupted at middle of tergite 3; pecten of cilia present on posterior margin of tergite 3 of male; tergites 3 – 5 with a narrow to moderately wide medial longitudinal black stripe and two broad dark fuscous to black lateral longitudinal bands over all three tergites, which are confluent with the black anterior band of tergite 3. A pair of oval fulvous shining spots on tergite 5. Sternites 1, 3, and 4 fuscous; sternite 2 yellowish; sternite 5 black. Posterior lobe of surstylus long. (Fig. 15). Sternite 5 (Fig. 16) of male slightly concave on posterior margin.

Female. Unknown.

Etymology. The species is named after the distribution in China.

Holotype ♂, Yunnan, Xishuangbanna, Mengla (21.4° N, 101.5° E), Aug. 2009, BAI Yong-Hua. Paratypes: 1 ♂, Yunnan, Xishuangbanna, Mengla, Aug. 2009, BAI Yong-Hua; 1 ♂, Yunnan, Xishuangbanna, Mengla, 15 Aug. 2010, BAI Yong-Hua.

Distribution. China (Yunnan).

Remarks. The new species is somewhat similar to *B. (P.) complicata* White from Timor in the following

表 1 样品来源、信息和 GenBank 登录号
Table 1. The source, information and GenBank accession number of samples used in this study.

种名 Species	采集地点和时间 Locality and time	传统分类位置 Taxonomic position	GenBank 登录号 GenBank accession No.
统帅青凤蝶 <i>Graphium agamemnon</i>	云南西双版纳 2009-03	燕凤蝶族, 青凤蝶属	JF747522
燕凤蝶 <i>Lamproptera curia</i>	云南西双版纳 2009-03	燕凤蝶族, 燕凤蝶属	JF747525
绿带燕凤蝶 <i>Lamproptera meges</i>	中国	燕凤蝶族, 燕凤蝶属	GQ268354 *
斑凤蝶基本型 <i>Chilasa chytia f. chytia</i>	云南西双版纳 2009-03	凤蝶族, 斑凤蝶属	JF747526
斑凤蝶异常型 <i>Chilasa chytia f. dissimilis</i>	云南西双版纳 2009-03	凤蝶族, 斑凤蝶属	JF747527
美凤蝶 <i>Papilio memnon</i>	云南西双版纳 2009-03	凤蝶族, 凤蝶属, 美凤蝶亚属	JF747528
蓝美凤蝶 <i>Papilio protenor</i>	云南景洪 2009-02	凤蝶族, 凤蝶属, 美凤蝶亚属	JF747529
玉斑美凤蝶 <i>Papilio helenus</i>	云南西双版纳 2009-03	凤蝶族, 凤蝶属, 美凤蝶亚属	JF747530
宽带美凤蝶 <i>Papilio nephelus</i>	云南西双版纳 2009-03	凤蝶族, 凤蝶属, 美凤蝶亚属	JF747531
纳补美凤蝶 <i>Papilio noblei</i>	云南景洪 2009-02	凤蝶族, 凤蝶属, 美凤蝶亚属	JF747532
玉带美凤蝶 <i>Papilio polytes</i>	云南景洪 2009-02	凤蝶族, 凤蝶属, 美凤蝶亚属	JF747533
柑橘凤蝶 <i>Papilio xuthus</i>	云南西双版纳 2009-03	凤蝶族, 凤蝶属, 华凤蝶亚属	JF747534
巴黎翠凤蝶 <i>Papilio paris</i>	云南西双版纳 2009-03	凤蝶族, 凤蝶属, 翠凤蝶亚属	JF747535
碧翠凤蝶 <i>Papilio bianor</i>	海南	凤蝶族, 凤蝶属, 翠凤蝶亚属	HM175729 *
达摩翠凤蝶 <i>Papilio demoleus</i>	澳大利亚	凤蝶族, 凤蝶属, 翠凤蝶亚属	DQ227733 *
金凤蝶 <i>Papilio machaon</i>	罗马尼亚	凤蝶族, 凤蝶属, 凤蝶亚属	HQ004890 *
宽尾凤蝶 <i>Papilio elwesi</i>	中国	凤蝶族, 宽尾凤蝶属	EU559054 *
红珠凤蝶 <i>Pachliopta aristolochiae</i>	云南西双版纳 2009-03	裳凤蝶族, 珠凤蝶属	JF747536
多姿麝凤蝶 <i>Byasa polyeuctes</i>	云南西双版纳 2009-03	裳凤蝶族, 麝凤蝶属	JF747537
玄麝凤蝶 <i>Byasa stenoptera</i> (白斑麝凤蝶海南亚种)	云南西双版纳 2009-03	裳凤蝶族, 麝凤蝶属	JF747538
麝香曙凤蝶 <i>Atrophaneura alcinous</i>	韩国	裳凤蝶族, 曙凤蝶属	GU372547 *
裳凤蝶 <i>Troides helenia</i>	印度 1990-07	裳凤蝶族, 裳凤蝶属	EF514456 *
金裳凤蝶 <i>Troides aeacus</i>	台湾 2005-06	裳凤蝶族, 裳凤蝶属	AB576585 *
钩凤蝶 <i>Meandrusa payeni</i>	老挝	喙凤蝶族, 钩凤蝶属	GQ268353 *
褐钩凤蝶 <i>Meandrusa sciron</i>	中国	喙凤蝶族, 钩凤蝶属	GQ268352 *
喙凤蝶 <i>Teinopalpus imperialis</i>	越南	喙凤蝶族, 喙凤蝶属	GQ268351 *
金斑喙凤蝶 <i>Teinopalpus aureus</i>	广西	喙凤蝶族, 喙凤蝶属	HM246475 *
阿波罗绢蝶 <i>Parnassius apollo</i>	德国	绢蝶科, 绢蝶属	HM393174 *

* 示 GenBank 下载序列.
* Sequence obtained from GenBank.

(0.5 mg/mL 1 × TES, 1 % SDS), 在 55 °C 水浴中消化 8 ~ 12 h。消化液采用常规的酚/氯仿法提取总 DNA, 所得悬浮液经乙醇沉淀后用 70 % 乙醇洗涤, 37 °C 烘干, 50 μl TE 缓冲液 (pH 值 8.0) 中溶解。1 % 的琼脂糖凝胶电泳检测 DNA 样品, 取条带清晰无拖尾的样品 4 °C 保存备用。

1.3 引物合成、PCR 扩增及序列测定

扩增每个物种的线粒体 CO I 基因序列, 所用引物的核苷酸序列如下: LCO I, 5'-TTT CTA CAA ATC ATA AAG ATA TTG G-3'; HCO I, 5'-TAA ACT TCA GGG TGA CCA AAA AAT CA-3', 引物由上海生工公司 (上海, 中国) 合成。PCR 扩增反应体系总体积为 50 μl, 包含 25 μl 2 × Taq PCR MasterMix (包含 0.1 U Taq Polymerase/μl, 500 μmol/L dNTP each, 20 mmol/L Tris-HCl

(pH 8.3), 100 mmol/L KCl, 3 mmol/L MgCl₂ 及其它稳定剂和增强剂), 20 μl H₂O, 1.5 μl LCO I (10 μmol/μl), 1.5 μl HCO I (10 μmol/μl), 2 μl 模板 DNA (10 ng/μl)。反应程序为 94 °C 预变性 5 min, 94 °C 变性 30 s, 47 °C 退火 30 s, 72 °C 延伸 1 min 30 s; 35 个循环后 72 °C 延伸 10 min。扩增产物经 1.2 % 琼脂糖凝胶电泳, EB 染色, 凝胶成像系统 (美国, UVP 公司) 检测。

对含有目的 DNA 片段的琼脂糖凝胶在紫外灯下切割, 经纯化试剂盒 (沃森生物技术公司, 上海) 对 DNA 片段进行纯化。回收产物达 10 ng/μl 的纯化样品, 委托北京六合华大基因科技股份有限公司进行正反链双向测序。

1.4 数据处理

对凤蝶亚科 11 属 27 种蝶类线粒体 CO I 基因部

characters: face fulvous with a black circular spot in each antennal furrow; frons with 2 fr s and 1 orb s, without spots at bases of setae; scutum yellow to red brown in ground color with black markings; mesonotum with three postsutural yellow vittae. It can be separated from the latter by the following characters: presutural area with a narrow medial longitudinal black stripe; scutellum yellow with a medium-sized black spot at apex; all femora yellow with black spots at apices, outside of fore tibiae and basal 1/2 of mid tibiae brown; wing with costal band confluent with R_{2+3} ; tergites 3–5 of abdomen with a medial longitudinal black stripe; shining spots present on tergite 5. But in *B. (P.) complicata*, the center of the presutural area is red brown; the scutellum is yellow without black spot at apex; all femora, fore tibia and mid tibia are yellow; the costal band of the wing is wide and confluent with R_{4+5} , transverse mark is present over crossveins dm-cu and r-m; tergites 3–5 of the abdomen are red brown without a medial longitudinal black stripe; there are not shining spots on tergite 5 (White, 1999).

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中国云南果实蝇属两新种和一新纪录记述（双翅目，实蝇科）

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摘要 记述了我国果实蝇属 2 新纪录亚属，爪哇果实蝇亚属 *Javadacus* 和巴布亚果实蝇亚属 *Papuodacus*；1 新纪录种，三条果实蝇 *B. (J.) trilineata* (Hardy)；及 2 新种，端黄果实蝇 *Bactrocera (Javadacus) apiciflava* Yu, He et Chen, sp. nov. 和中华果实蝇 *Bactrocera (Papuodacus) sinensis* Yu, Bai et Chen, sp. nov.。新种模式标本保存于中国检验检疫科学研究院动植物检疫所，北京。

端黄果实蝇，新种 *Bactrocera (Javadacus) apiciflava* Yu, He et Chen, sp. nov. (图 1~6)

背侧片全黄；前股外侧黑亮，内侧黄；翅端扩大成斑。

关键词 双翅目，实蝇科，果实蝇属，新种，中国。

中图分类号 Q969.456.8

正模 ♂，云南河口，2008-09，和万忠采。副模 3 ♂ ♂，同正模。

词源：新种种名据其特征小盾片端部黄而定名。

中华果实蝇，新种 *Bactrocera (Papuodacus) sinensis* Yu, Bai et Chen, sp. nov. (图 12~16)

小盾片黄，端部具黑斑；股节端部具黑斑；翅前缘带达 R_{2+3} ；腹部 3~5 背板具黑中纵条。

正模 ♂，云南勐腊，2009-08，白永华采。副模：1 ♂，同正模；1 ♂，2010-08-15，其他数据同正模。

词源：新种种名据其分布地中国而定名。